

# INTERACTION OF ENVIRONMENTAL FACTORS AND SEX ON THE PREVALENCE OF CONGENITAL ANOMALIES

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**Background and Aims:** The exact aetiology of many congenital anomalies (CA) is unclear. Genetic and environmental factors have been suggested. Using 10,311 cases notified to the Northern Congenital Abnormality Survey (1985-2003) we reported sex ratios for a range of CAs<sup>1</sup>. Here we explore interactions between environmental factors and sex ratio.

**Methods:** A range of environmental and socio-economic variables were extracted for the 10,311 CA records, including; landscape composition (land cover, road networks and topology), population density and measures from the Index of Multiple Deprivation 2004 (IMD). Specific CAs were selected (hydrocephalus, ventricular septal defect (VSD), oesophageal atresia, upper limb reduction, other trisomy and DiGeorge syndrome (DGS)), that had shown non-significant sex-bias to avoid analysing those CAs known to be prevalent in one sex. These data were analysed, with birth weight, gestation age and year of birth, where the response variable was sex, using a logistic model to test the null hypothesis that the proportion of males and females associated with a given CA was unaffected by environmental factors. Multi-model inference (MMI) was used to check the relative weighting of significant predictors.

**Results:** Hydrocephalus showed measures of landscape composition and abundance of motorway/primary roads as significant factors in the sex ratio of cases.

Upper limb reduction showed a significant effect of both IMD score and land cover. IMD shows a strong association (est=0.027; P=0.009), implying a bias towards male births with higher IMD scores (more deprived).

No variable in the analysis of VSD, oesophageal atresia or other trisomy and DGS was significant.

**Conclusion:** There is a variation between the results for these CAs. While not all displayed an association between environmental factors and the sex ratio, some showed a significant relationship. This study indicates a need for further investigation with more CAs and environmental variables with application of more sophisticated analysis.

## References:

1. Samarasekera DS, Tennant PWG, Pless-Mulloli T, Rankin J, Sex differences in the prevalence of congenital anomalies: A population based study, Birth Defects Part A, under consideration (2011)